Great Aviation Failures
World's Fastest Flying Boat
By Ray Wagner

In 1938, San Diego's Consolidated Aircraft, today called the Convair Division of General Dynamics, wanted to replace its successful PBY flying boat with a new design. Company president Reuben Fleet envisioned a radical new prototype, the Model 31 flying boat.

That design, by Chief Engineer Isaac M. Laddon, was going to be the fastest flying boat in the world. Everything would be new- wing, power plant, and hull shape. It used a long narrow wing with an airfoil section invented by David R. Davis. Wind tunnel tests at Cal Tech on this wing indicated a lower drag effect than usual, so Consolidated bought exclusive rights to use the Davis airfoil for a year.

The twin-engined Model 31 was also the first aircraft to employ the Wright R-3350 Duplex Cyclone, the engine that would eventually power the B-29, although in 1939 that powerplant was far from ready for production. This engine was then rated at 2000 hp at 2400 rpm for takeoff, but was limited to 1900 hp at 2200 rpm with the 16' Hamilton three-bladed hydromatic propellers. Normal rating was 1500 hp at 15,600'.

Performance estimates made in June, 1938, indicated that this design would weigh 22,274 lbs. empty, and at 31,500 lbs. design gross weight would have a top speed of 270 mph at 15,000'. If weight were increased to the overload limit of 50,000 lbs., top speed would still be 258 mph. The PBY-4 then being built for the Navy did only 197 mph at design weight.

On July 6, 1938, Laddon authorized construction of a prototype, with C. Burr Carroll as project engineer. Two versions of Model 31 were planned: a patrol bomber with five guns, 4,000 lbs. bomb load, and a 47,216 lb. gross weight, along with a proposal for an airliner accommodating 32 passengers at night or 50 on day trips.

Either version could fit the deep hull with two decks that gave Model 31 its "Pregnant Guppy" look. This hull was 69'10" long, 15'5" deep, and 9'2" wide. The prototype itself was finished in stripped condition, adaptable to either version. Dimensions included a 110' wing span and 1048 sq. ft. wing area. Total length was 72'6", and height was 23'4" on beaching gear. Both the tricycle beaching gear and the floats under the wings were retractable. The beaching gear enabled the flying boat to enter and leave the water without the aid of a beaching crew.

After only ten months, the first flight was made from San Diego Bay on May 5, 1939. William Wheatley was the pilot, along with George Newman, Jack Kline, and Bob Keith. This same crew would also make the first XB-24 flight in December. Wheatley would be the pilot of the first 43 Model 31 flights.

Flight testing went well until test #13, when the right engine malfunctioned. Before test #14 on August 15, 42 changes were made, including a new right engine and installation of fixed wing slots. High speed then reached the promised 270 mph at 15,000', even with a 35,586 lbs. gross weight.

But on August 25, at 42,000 lbs. gross, the left float tore off and the tail was damaged during a landing. This mishap delayed the next flight to October 5, when Model 31 reappeared with a raised and rebuilt horizontal stabilizer with center cutout and two trim tabs.

The wider tail increased elevator area from 44 to 66 sq. ft. and empty weight by 223 lbs.

Buffeting continued to be a problem, however, and the plane returned to the shop in December for rework, and a 20" hull extension was added. Model 31 was flown again on December 21, but then testing was again interrupted to insure a timely start for Consolidated's B-24 bomber for the Army. The B-24's original tail section, like its long narrow Davis wing, was based on the Model 31 flying boat.

The XB-24 prototype was being rushed to completion before the end of 1939, but had been ordered before the Model 31 had made the flight tests that revealed the problems with the original 22' span elevator design. So that the first XB-24 flight could be made before the first of the year, the Model 31's extended tail was removed and attached to the bomber prototype so it could make its maiden flight, wheels down, on Friday, December 29.

Other Model 31 features tried on the XB-24 were fixed wing slots and a small fairing installed between the elevators. Neither feature proved necessary for production aircraft. Tail surfaces with a 26' span were quickly switched back so the Model 31 could resume tests on January 2, 1940.

United States Navy interest in the Model 31 was slow in coming, perhaps because as Reuben Fleet said, "They wouldn't have anything to do with the Model 31 because they hadn't had their finger in the pie in developing it." Instead, the Navy ordered 200 more of the less-expensive and reliable PBYs, which could be delivered in short order.

A Navy Trail Board did make eight flight tests from March 25 to April 2, 1940. When the flying boat was loaded to 46,620 lbs. on March 28, high speed was measured at 230 mph at sea level, 245 mph at 6,600', 255 mph at 15,000', and 258 mph at 16,600', while service ceiling was 24,500'. Addition of a dummy top turret on the last two flights reduced speed 2.5 mph.

By April 2, the company had spent a million dollars on Model 31, which had made 51 tests with 59 hr. 52 min. flight time. A proposal was presented for a patrol bomber version with three power-operated gun turrets (nose, top, and tail), armor, and self-sealing tanks. But no Navy contract was offered and tests were suspended, except for some trials in March, 1941, with dummy top and tail turrets. Boeing, however, got a contract for its larger XPBB-1 flying boat using the same powerplant with the B-29 wing.

When America entered the war, Navy interest in the fast flying boat began to revive. Production of the PBY-5 was scheduled to end in San Diego in March 1944, and a replacement was needed. On April 13, 1942, the Navy officially accepted the Model 31 in order to have it converted by 1943 to a prototype XP4Y-1 "Corregidor" patrol plane. After test flights by Russ Rogers and R.A. McMachin from April 22 to May 2, the plane was sent back into the factory for rebuilding.

A Navy production plan was begun by a letter contract on July 8 for 200 P4Y-1s to be built at a new Consolidated factory in New Orleans. The XP4Y-1 was rebuilt to a specification dated November 9, 1942, using two new R-3350-8 Duplex Cyclones that offered 2,300 hp for takeoff and 1,800 hp at 13,600'. The beaching gear was deleted.

In the bow was a radar above a movable 37 mm. gun and its gunner. Twin .50 caliber guns were in the top turret and another pair in the tail position. Eight 325 lb. depth charges or four 1,000 lb. mines inside the fuselage moved out on rack tracks under the wing when ready

for release. No provision was made for conventional bombing, so the usual B could be dropped from the designation.

The P4Y-1 was expected to weigh 29,344 lbs. empty, and gross 46,000 lbs. with seven men and eight depth charges. Range was estimated as 2,300 miles at 136 mph cruising speed with 1,545 gallons. Top speed was to be 247 mph at 13,600′ or 231 mph at sea level, and stalling speed was 89 mph.

By July 1943 the XP4Y-1, serial number 27852, was completed and flight tests begun. But on September 11, 1943, the whole P4Y-1 program was cancelled, and Convair was told to build instead PBYs in the New Orleans plant.

The main reason for the cancellation was that the entire supply of R-3350 engines now seemed to be necessary for the B-29 bomber program. Boeing's own XPBB-1 was cancelled for the same reason.

Another factor was the growing use of landplanes for the patrol mission, as the network of available airfields expanded. Convair itself also produced the successful PB4Y-2 Privateer, a development of the B-24 that met the Navy's needs for a heavily-armed patrol bomber for the war's last year. So the Model 31/P4Y-1 failed to reach production by no fault of its own.

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Photo Captions: (all photos from SDAM)
1. The original Model 31 in 1939, sitting on its beaching gear.
2. By March 1941, the flying boat has dummy turrets and a new tail.
3. Rebuilt for war as the XP4Y-1 in 1943.